

# Reducing Methane Emissions

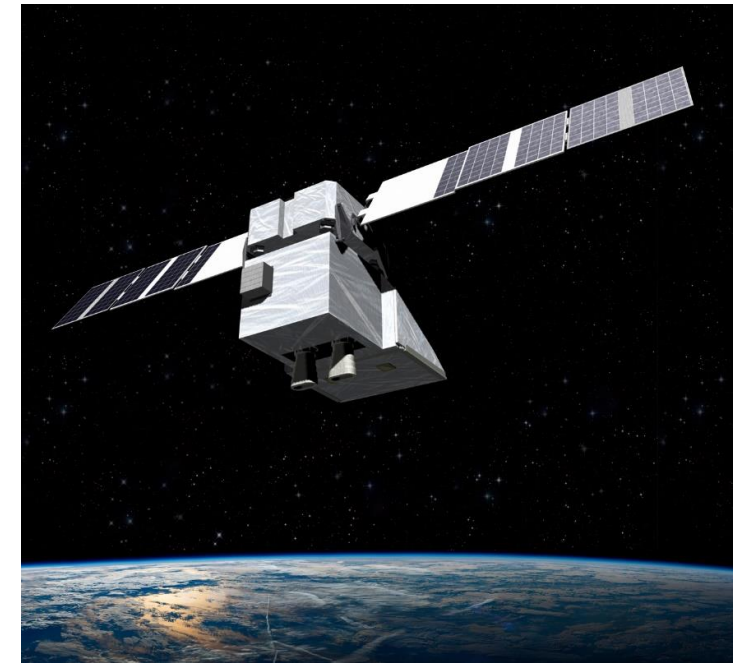
## Data and Satellites are Critical

Steven Hamburg

Chief Scientist - Environmental Defense Fund

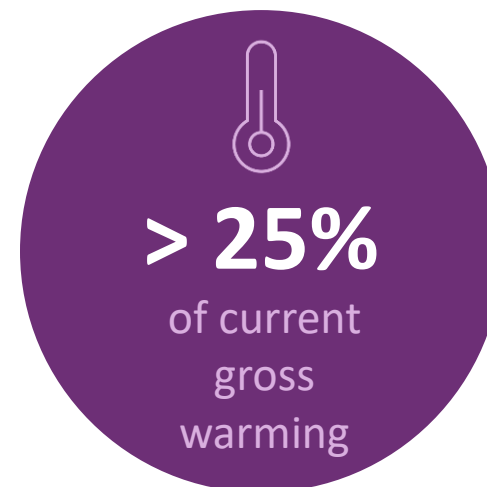
Executive Manager - MethaneSAT LLC

September 8, 2021





# Methane plays a major role in current and future warming



# We have tools to cut global methane emissions in half within 10 years



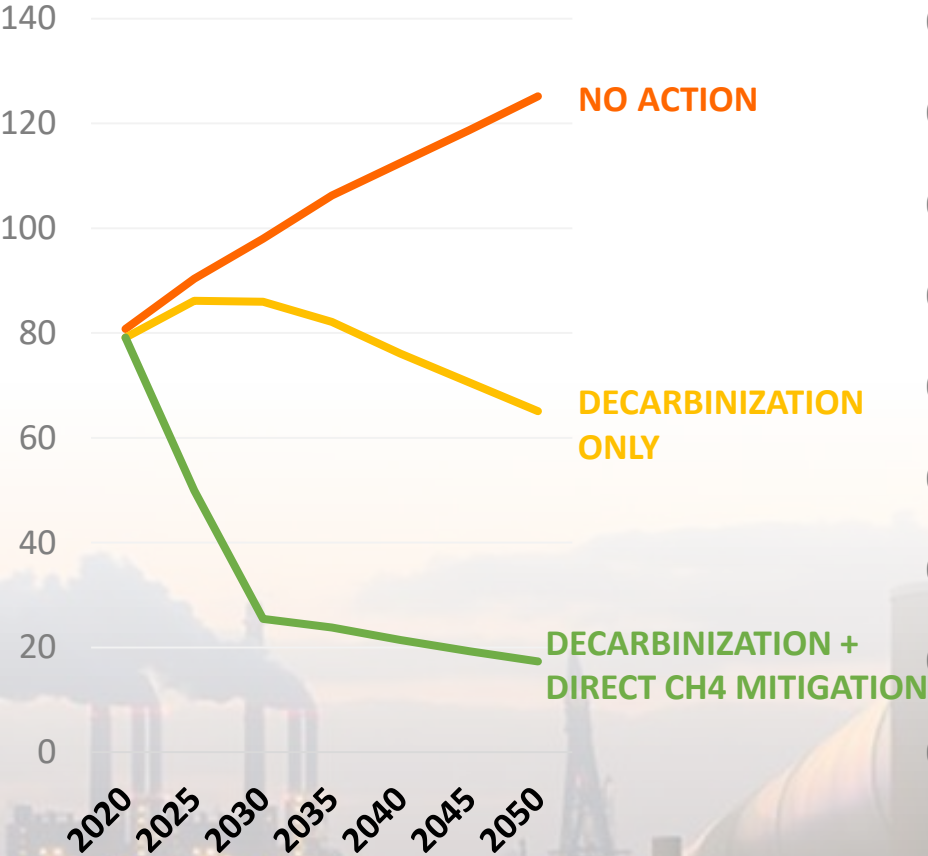
EDF

ENVIRONMENTAL DEFENSE FUND

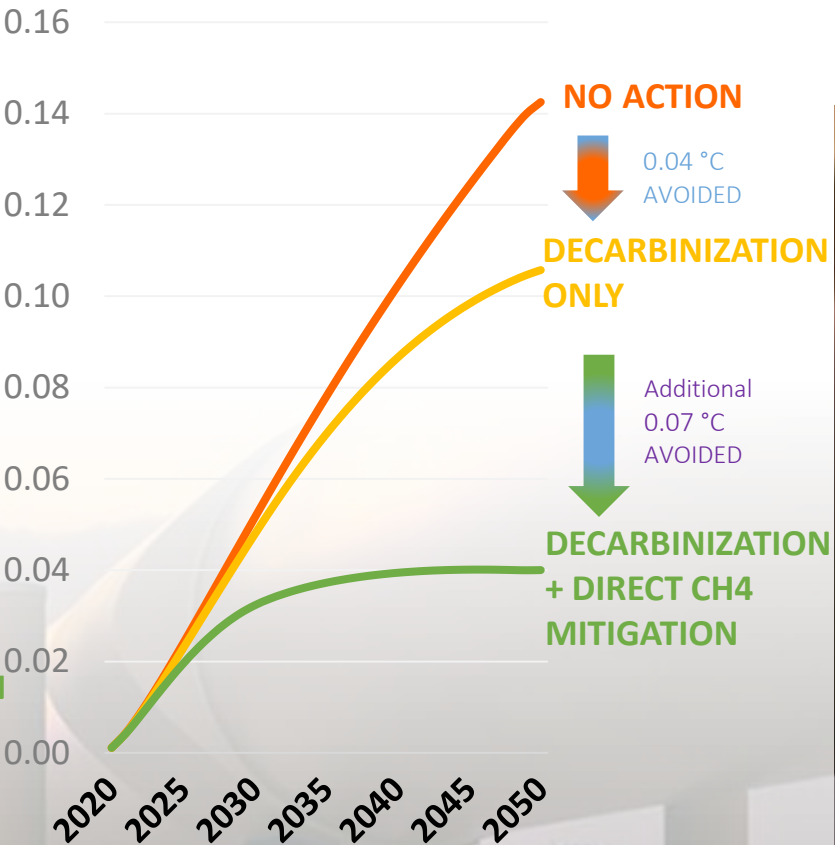
Finding the ways that work

# Relying on methane reduced from decarbonization is not enough

FUTURE OIL & GAS  
METHANE EMISSIONS  
(MMt/yr)



TEMPERATURE  
RESPONSES  
(°C)



Cite as: R. A. Alvarez *et al.*, *Science*  
10.1126/science.aar7204 (2018).

# Assessment of methane emissions from the U.S. oil and gas supply chain

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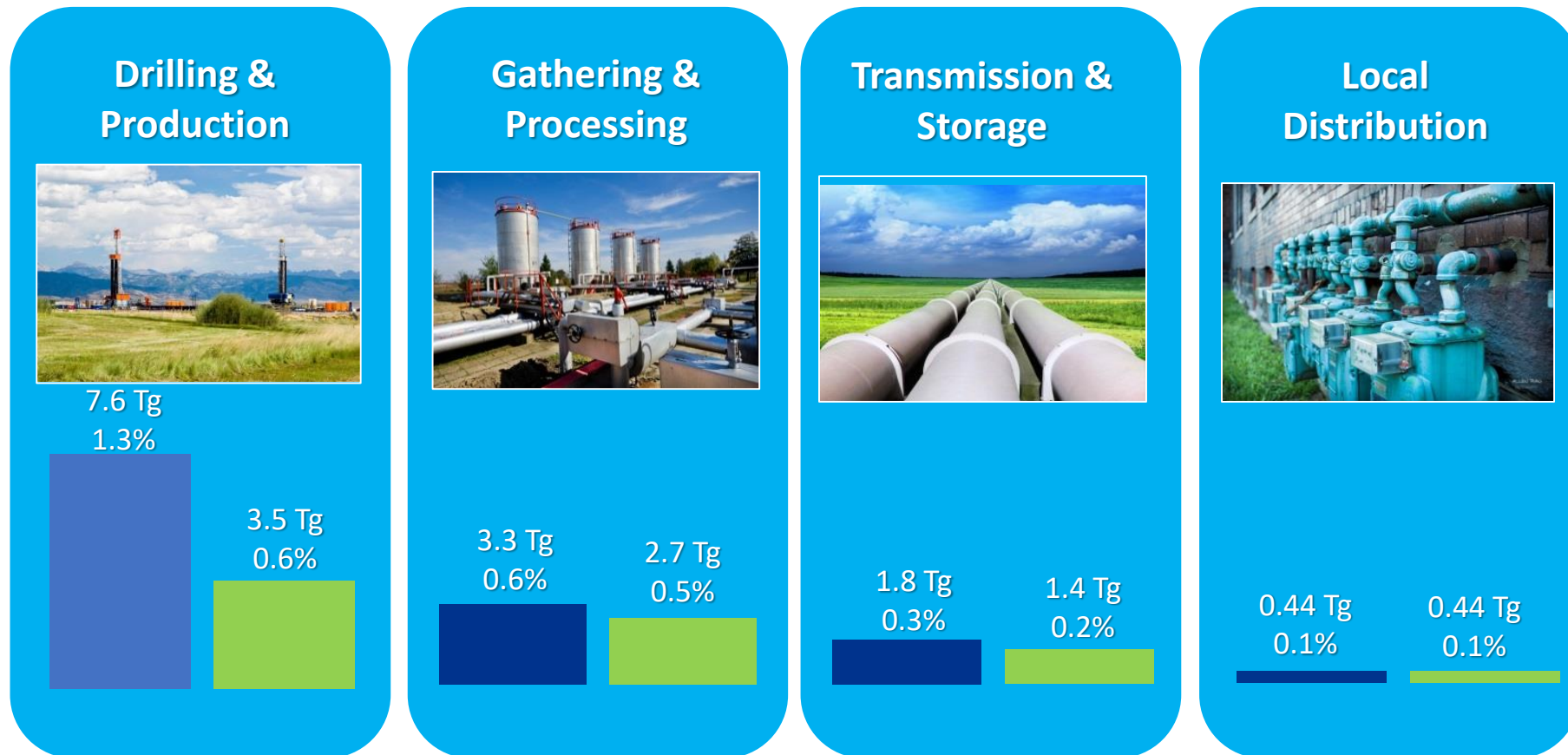
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# U.S. oil and gas supply chain emissions



 Methane Synthesis  
Alvarez et al 2018

 2017 EPA GHG Inventory  
(For year 2015)

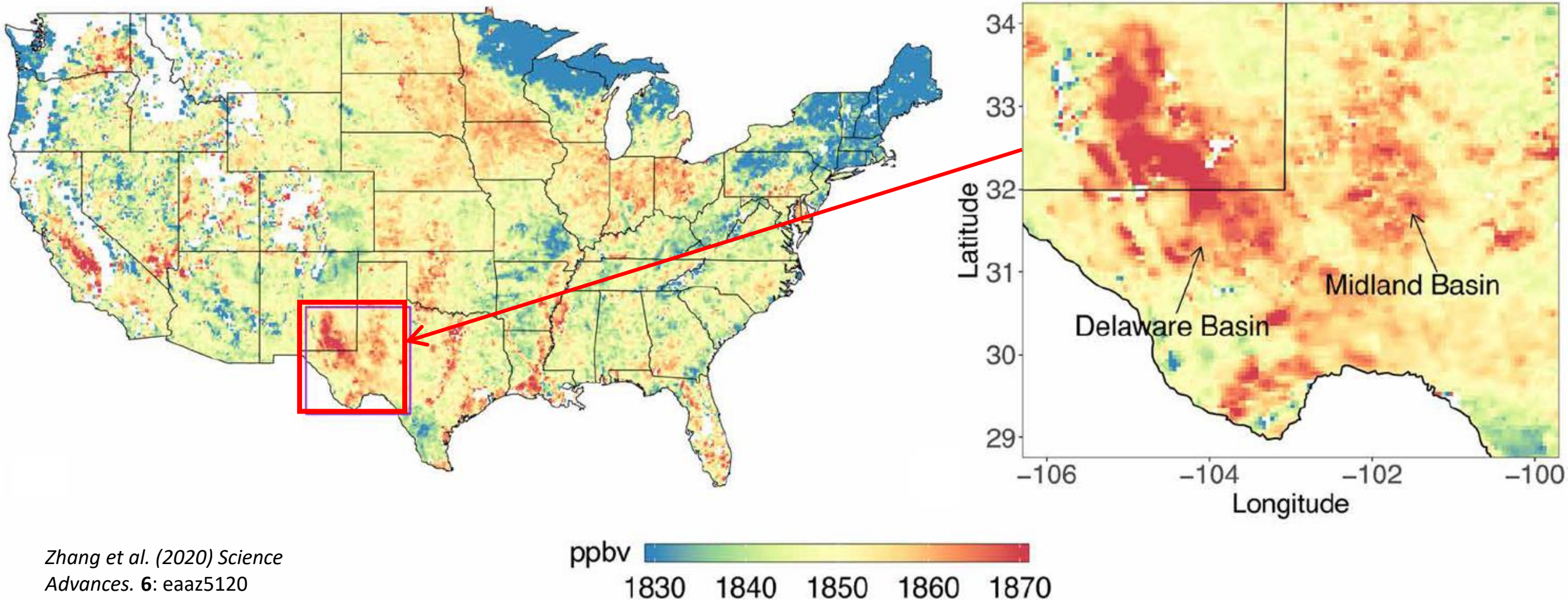
# What is the purpose of MethaneSAT?

- **Motivate countries and** companies to reduce methane pollution
- Make the full extent of the problem (anthropogenic methane emissions) **apparent, unavoidable, and actionable**
- **Launch a new, low-cost, purpose-built satellite** that will map and measure oil and gas methane emissions worldwide
- Potential to **assess emissions** from the full range of man-made sources



# ***Recent satellite observations reveal the Permian methane hotspot***

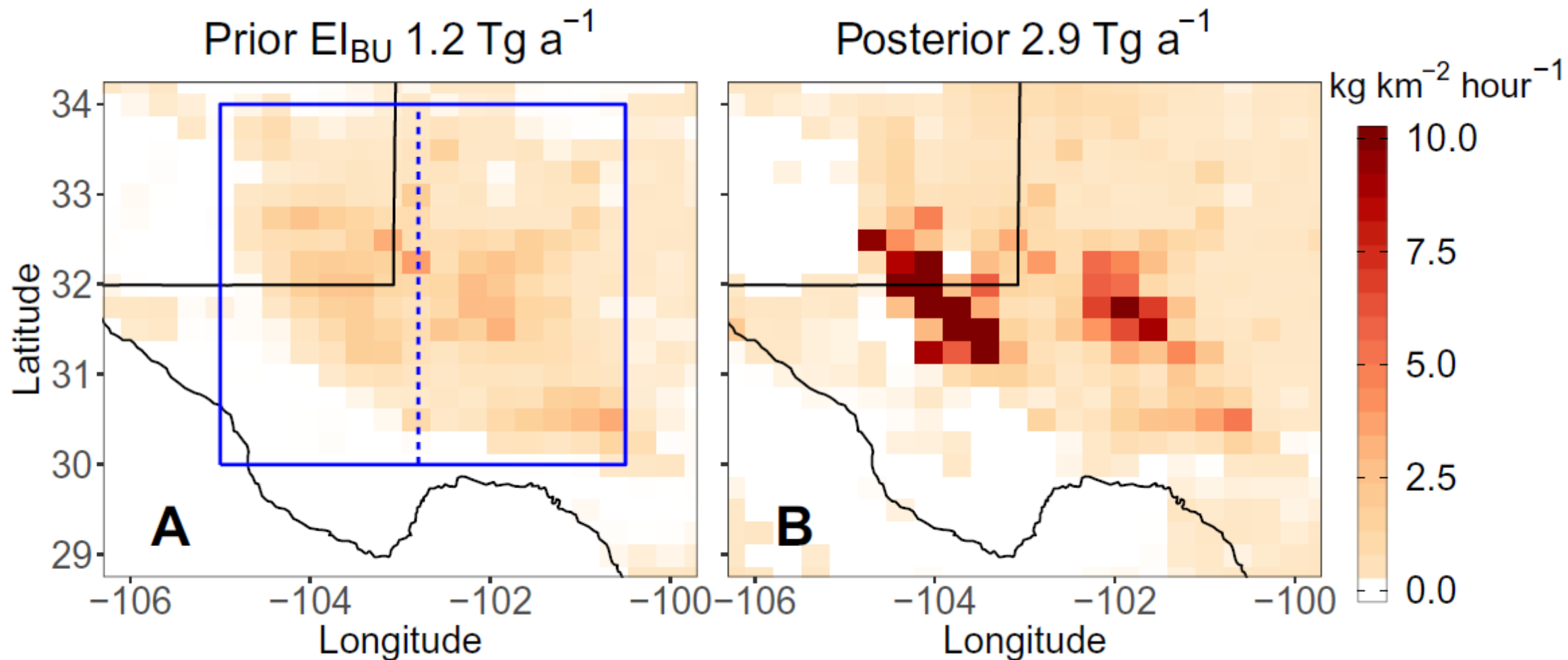
TROPOMI methane data averaged from May 2018 – March 2019



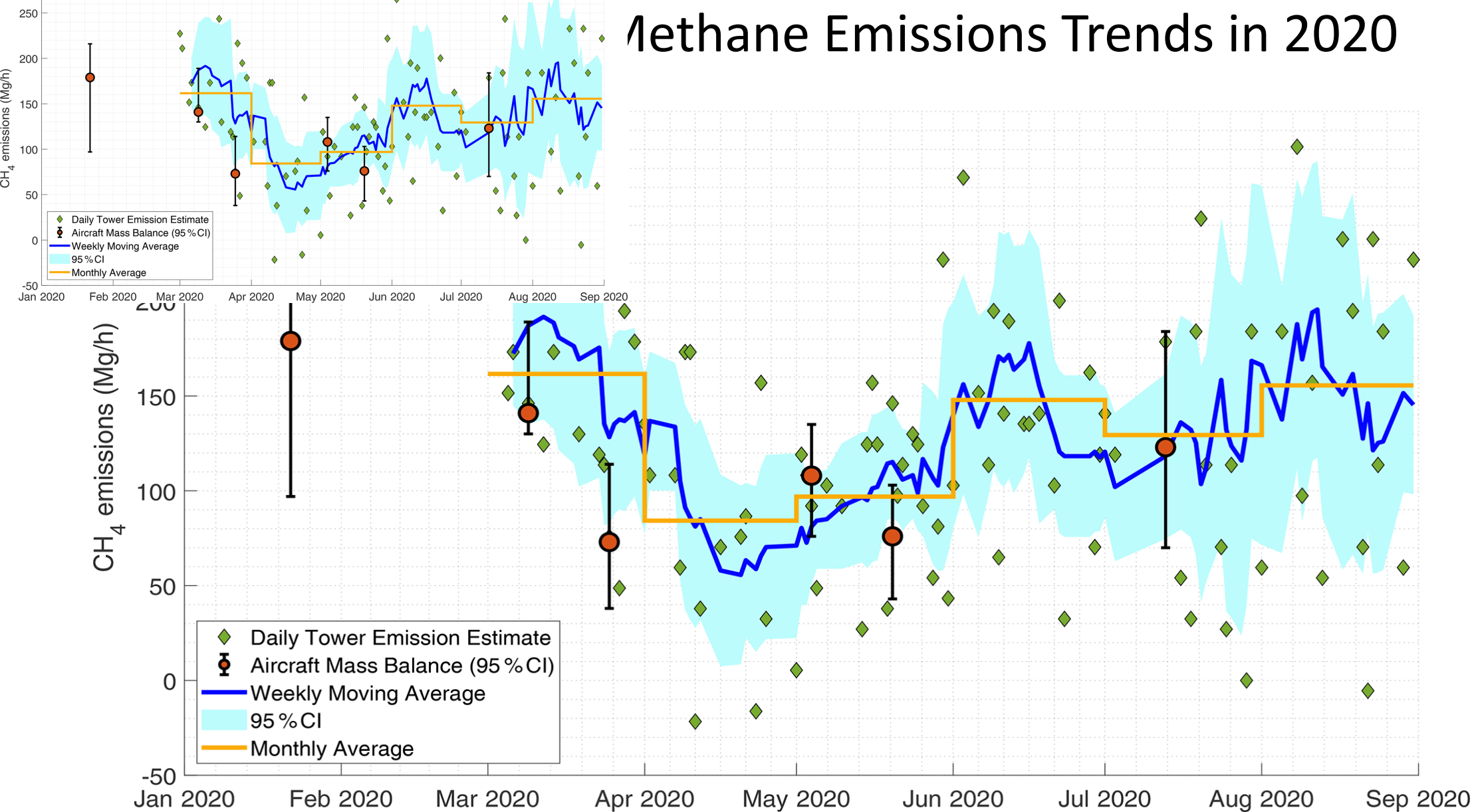
Zhang et al. (2020) *Science Advances*. 6: eaaz5120



## TROPOMI data reveal highest methane emissions from the Permian Basin ever measured from any U.S. oil and gas basin



# Methane Emissions Trends in 2020



Lyon et al. 2021. Concurrent variation in oil and gas methane emissions and oil price during the COVID-19 pandemic. *Atmospheric Chemistry and Physics* 21: 6605–6626, <https://doi.org/10.5194/acp-21-6605-2021>

# MethaneSAT Mission



- Primary Mission Objective
  - Provide the data needed to enable a 45% reduction in CH<sub>4</sub> emissions from oil & gas production regions by 2025
- Mission Overview
  - Regular monitoring of regions accounting for > 80% of global oil & gas production
  - Designed to detect, quantify, and track **area emission** rates as well as from **point sources**
  - Targeting satellite in sun-synchronous orbit
  - Launch ready by Q4 2022
  - Flux data product publicly available free of charge
  - All Data products freely available to the larger science community
  - Comprehensive advocacy campaign

# Satellites Are *Complementary* For Tackling Global Methane Emissions

Instrument	Dates operational	Grid size (subgrid pixel) (km <sup>2</sup> )	Swath (km)	Precision (ppbv)
<b>MethaneSAT</b>	<b>2022</b>	<b>1.4 × 1.4 (&lt; 1 km raw)</b>	<b>200±</b>	<b>2-3*</b>
GOSAT	2009 -	10 km dia., single	Sparse	~13
GHGSat	2016 -	0.05 x 0.05	12 x 12	~50
TROPOMI	2017-	7 × 7	2600	~11
GOSAT-2	2018 -	10 km dia., single	Sparse	~8
GeoCARB	2022 -	3 × 6	2800	~18
Carbon Mapper	2023 -	0.03 x 0.03	18km	~30

\* Gradient measured over 10 – 100 km length scales.

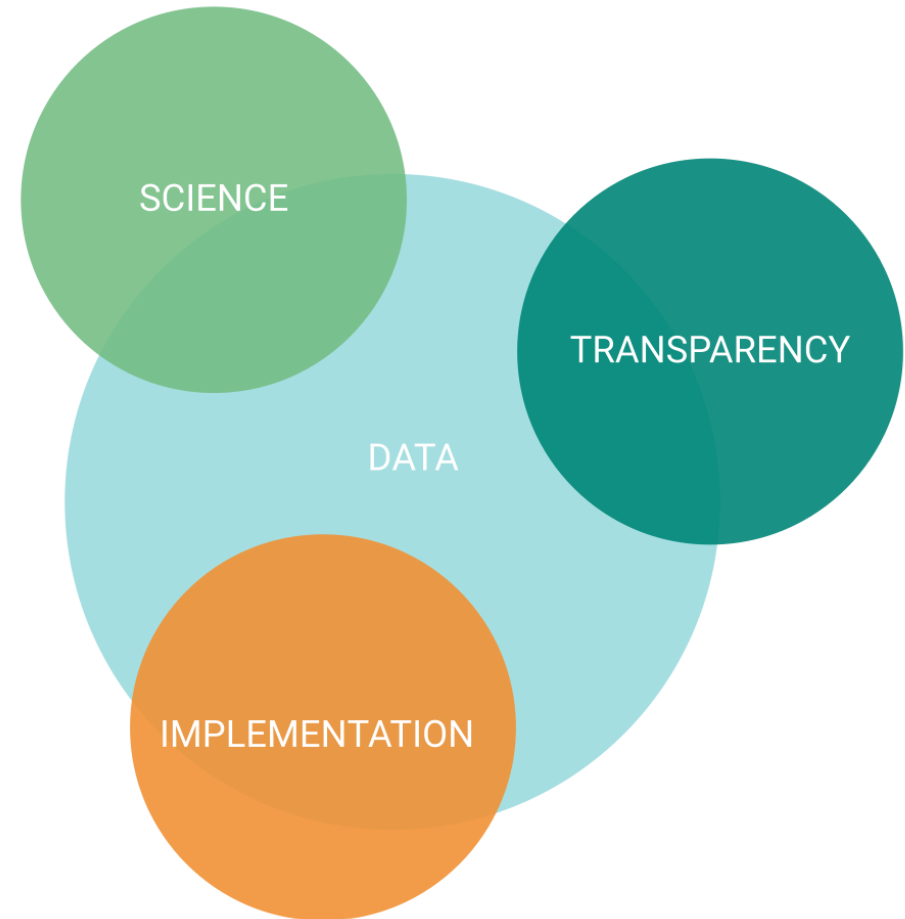


# The International Methane Emissions Observatory will revolutionize the global methane emissions approach

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**Each element is necessary, but not sufficient to drive change**

**IMEO interconnects activities across the methane ecosystem**



# An International Methane Emissions Observatory will provide consistency among multiple methane programs

